

A NEW NARROWLY ENDEMIC SPECIES OF *CLEMATIS*  
(RANUNCULACEAE: SUBGENUS *VIORNA*)  
FROM NORTHEASTERN TEXAS

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ABSTRACT

*Clematis carrizoensis*, a new narrowly endemic species of subgenus *Viorna*, is described from the Carrizo Sands of northeastern Texas. This species belongs to a complex of similar species characterized by glaucous and glabrous abaxial leaf surfaces and stems. Four additional species comprise this complex: *C. addisonii*, *C. glaucophylla*, *C. texensis*, and *C. versicolor*. *Clematis carrizoensis* is morphologically most similar to the scarlet sepaled *C. texensis* and the purplish-red to bluish-lavender sepaled *C. versicolor*. It differs from those two species in having yellowish-cream and lightly lilac-tinged sepals. From *C. addisonii* and *C. glaucophylla*, *C. carrizoensis* differs in sepal color and in having thicker and more reticulate leaves. All five species of the complex are allopatric and occupy somewhat different habitat types in different physiographic provinces. Further discussion of their morphological differences, geographic distribution, and habitat preferences is provided.

RESUMEN

Se describe *Clematis carrizoensis*, una nueva especie del subgénero *Viorna*, endémica de Carrizo Sands en el noreste de Texas. Esta especie pertenece a un complejo de especies similares caracterizadas por tener los tallos y el envés glaucos y glabros. El complejo tiene otras cuatro especies: *C. addisonii*, *C. glaucophylla*, *C. texensis*, y *C. versicolor*. *Clematis carrizoensis* es la más similar morfológicamente a *C. texensis* de sépalos escarlata y *C. versicolor* de sépalos que van del rojo púrpura al lavanda azulado. Difiere de estas dos especies por tener los sépalos amarillo crema ligeramente teñidos de lila. De *C. addisonii* y *C. glaucophylla*, se diferencia *C. carrizoensis* por el color de los sépalos y por tener las hojas más gruesas y más reticuladas. Las cinco especies del complejo son alopátricas y ocupan diferentes hábitats en provincias fisiográficas diferentes. Se ofrece una discusión sobre sus diferencias morfológicas, distribución geográfica, y preferencias de hábitat.

In North America, 18 species of *Clematis* (Ranunculaceae) belong to the subgenus *Viorna* (Pringle 1997). Of these, eight currently recognized species were included in the formerly recognized *Clematis* section *Viorna* subsection *Viornae* (Erickson 1943; Dennis 1976; Kral 1987): *C. addisonii* Britton, *C. glaucophylla* Small, *C. morefieldii* Kral, *C. pitcheri* Torr. & A. Gray, *C. reticulata* Walter, *C. texensis* Buckley, *C. versicolor* Small, and *C. viorna* L. These species are perennial vines characterized by relatively large (1–3 cm) urceolate flowers with thick leathery sepals that are mostly arranged in solitary or few-flowered cymes borne



on axillary peduncles subtended by leafy bracts (Dennis 1976). These taxa can be delineated into two groups based on leaf vestiture (Dennis 1976). The first group including *C. morefieldii*, *C. pitcheri*, *C. reticulata*, and *C. viorna* all have variously pubescent abaxial leaf surfaces and stems. The species of the second group, characterized by glabrous and glaucous abaxial leaf surfaces and stems, include *C. addisonii*, *C. glaucophylla*, *C. texensis*, and *C. versicolor*. These species form a complex here referred to as the *C. glaucophylla* complex.

The species of the *C. glaucophylla* complex can be distinguished from each other by relatively few qualitative morphological characteristics. Often, a combination of features, including morphology, habitat, and distribution, must be used to identify taxa. Several structures including the caudex, roots, inflorescences, and achenes offer little or no taxonomic value in separating most species of the complex (Erickson 1943; Dennis 1976). The most taxonomically useful traits are leaf texture, degree of leaf vein reticulation, and sepal color, although even these characters exhibit considerable variation and intergradation (Erickson 1943; Dennis 1976). For instance, leaf thickness is useful when extremes are exhibited, but Dennis (1976) noted that factors such as leaf age and environmental conditions often make it a difficult character to assess. Similarly, degree of vein reticulation is a useful character when found in its extremes but it can be confounding when trying to evaluate the continuum between extremes (Dennis 1976). Erickson (1943) concurred, noting that while reticulate venation is a valuable taxonomic character, "it is not often possible to distinguish between degrees of reticulation consistently." Dennis (1976) considered sepal color to be important for distinguishing species of the complex; for example thin-leaved specimens of *C. versicolor* can only be distinguished from *C. glaucophylla* by sepal color. Other characteristics, including degree of leaf dissection, leaflet shape, flower shape, and stamen vestiture, are only generally useful for distinguishing species and are apparently never diagnostic. While the species of the *C. glaucophylla* complex may be difficult to differentiate morphologically, all members of the complex exhibit specific physiographic preferences (Dennis 1976) and have non-overlapping ranges (Fig. 1).

*Clematis texensis* and *C. versicolor* are completely allopatric with the former restricted to the Edward's Plateau of Texas and the latter confined to the Interior Highlands (Arkansas, Missouri, Oklahoma) and Interior Low Plateaus (Alabama, Kentucky, Tennessee). They differ consistently in flower color and generally in leaf dissection and leaflet shape. Both species usually have relatively thick and conspicuously reticulate leaves. Erickson (1943) called attention to possible intermediate populations occurring in the region between the Interior Highlands and the Edward's Plateau noting that some specimens from this region have been difficult to assign to a particular species. Erickson arbitrarily referred questionable specimens from southwestern Arkansas and southeastern Oklahoma to *C. versicolor* and specimens from northeastern Texas (Smith



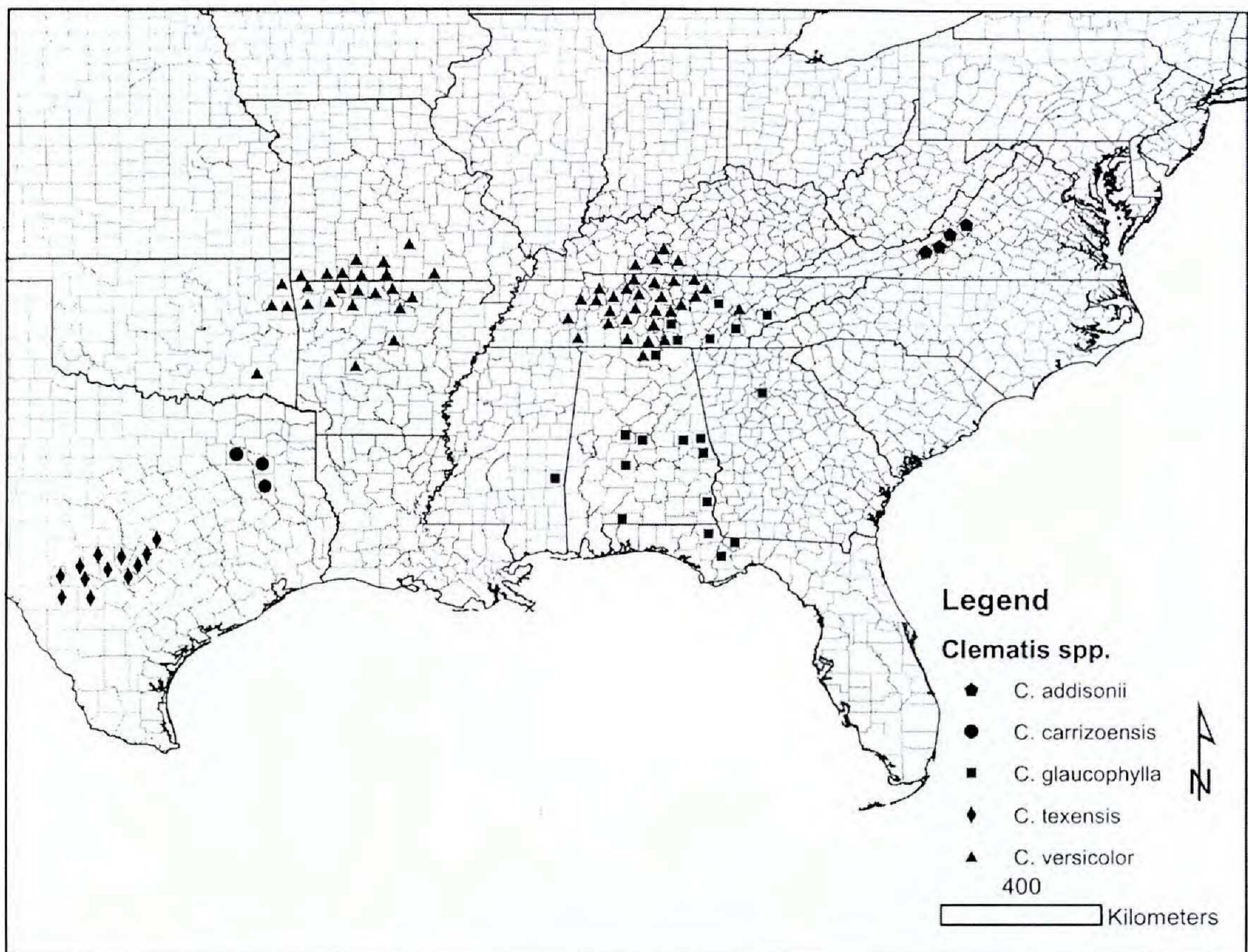


FIG. 1. Geographic ranges of the five species of the *Clematis glaucophylla* complex. (Adapted from Dennis 1976)

County) to *C. texensis*. Dennis (1976) contended that the Texas specimens were not *C. texensis* because the sepals were white to pale lavender rather than the bright red characteristic of that species. Interestingly, Dennis (1976) referred the Texas plants to *C. versicolor* in spite of the fact that they also differed from that species in sepal color and habitat and occurred in a different physiographic region ca. 200 km from the nearest known *C. versicolor* population. Additional study of herbarium specimens from this region coupled with field work has revealed that the Texas populations previously referred to *C. versicolor* actually represent a new species described below.

***Clematis carrizoensis*** D. Estes, sp. nov. (Figs. 2, 3, 4B). TYPE: U.S.A. TEXAS: Smith Co.: 1.5 mi NW of Lindale, sandy soil, vine growing along fence near roadside, 15 May 1949, J.F. Hennen 408, consists of 2 sheets (HOLOTYPE: SMU).

A Clematide versicolore sepalis e lilacinis flavidis-cremeis, foliis plerumque dissectioribus, foliolis saepiuscule emarginatis ad apices profundius cordatis basibus differt.

Perennial trailing or scandent **vines** to 3 m long, from a woody caudex bearing numerous smooth fleshy apparently unbranched roots. **Stems** stout proximally, slightly flexuous distally, 6 angled, 12 ribbed, glabrous and glaucous, reddish-brown to pale brown. **Leaves** oppositely decussate, imparipinnate to pinnate-



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HOLOTYPE OF:  
*Clematis carrizoensis* D. Estes  
Sheet 1 of 2

THE UNIVERSITY OF TENNESSEE  
*Clematis versicolor* Small

W. Michael Dennis December 1976

PLANTS OF TEXAS  
HERBARIUM OF SOUTHERN METHODIST UNIVERSITY

*Clematis reticulata* Walt.

Smith Co.: 1.5 miles northwest of Lindale.

Sandy soil. Vine growing along fence near roadside.

J. F. Hennen 1908 May 15, 1949

FIG. 2. Holotype (J.F. Hennen 408, SMU) of *Clematis carrizoensis*.





FIG. 3. *Clematis carrizoensis*. **A.** Portion of plant showing glaucous abaxial leaf surfaces. **B.** Close-up of abaxial surface of leaflet showing raised-reticulate venation. **C.** Flower, front view (note crispate sepal margins). **D.** Fruit. Photos above are from plants collected at same site as *D. Estes 07032*.

ternate, largest at about mid-stem, spreading, to 2.0 dm long, longer than wide to as wide as long; petiole stout, equaling or more frequently shorter than the lowest leaflets, to 6.0 cm long, glabrous and glaucous, base of opposing petioles usually connate; rachis geniculate; leaflets symmetrical or asymmetrical, paired, 8-10 on imparipinnate leaves, to 25 on proximal-most pinnate-ternate leaves, spreading to erect, reduced distally on rachis, the distal-most often form-



ing a short simple tendril, proximal-most entire or 2–3-lobed to trifoliate, ovate, broadly ovate, or subrotund, leaflets to 7.0 cm long and to 6.0 cm wide, coriaceous, base shallowly to deeply cordate, rounded, or truncate, margins slightly revolute, leaflet apices and lobe apices rounded, retuse, or occasionally acute, mucronate, adaxial and abaxial surfaces strongly reticulate with all vein orders conspicuously raised, forming an intricate reticulum, light green adaxially, paler abaxially, drying pale olive-brown to olive-green, glabrous and glaucous on both surfaces but more conspicuous on abaxial surface; petiolules 1.5–3.0(–7 cm) long, one-fourth to one-third length of leaflet or rarely one-half to as long as leaflet, stout, glabrous and glaucous. **Flowers** solitary on long axillary peduncles or rarely axillary and terminal, nodding, ovoid or urceolate; peduncles erect, curved or frequently abruptly recurved at apex, 7.5–17.0 cm long, stout, glabrous and glaucous, with 2 foliose bracts; bracts sessile or subsessile with petioles to 4.0 mm, positioned mostly near the middle of the peduncle, base subcordate to deeply cordate, margins entire or 2–3-lobed, otherwise similar in shape, size, texture, and vestiture to leaflets. **Sepals** erect, connivent, ovate-lanceolate to oblong-ovate, apices reflexed, 1.8–3.0 cm long, 0.7–1.3 cm wide, coriaceous, ca. 12 nerved, abaxially yellowish-cream, or greenish-yellow and often faintly tinged with lilac proximally, adaxial surface similar in color to the abaxial surface at least distally, mostly drying tan or light brown, edges narrowly crispate, white-tomentulose, abaxial and adaxial surfaces glabrous. **Stamens** linear, 1.8–2.4 cm long, the filaments flattened, in dried material dark brownish-red in the proximal half, densely pilose from below middle to apex, anthers 6.0 mm long, connective extended 1.75–2.0 mm beyond anthers, pilose. **Fruit** tightly clustered in spherical heads 4.5–8 cm in diameter, light brown, body rhomboidal-ovate, 6.0–9.0 mm long and 6.0–7.0 mm wide, acuminate at both ends, compressed, marginally thickened, sericeous; style curvate, 3.0–5.5 cm long, with a yellowish-brown plumose coma, hairs of coma spreading to ascending, to 3.0 mm long. Chromosome number unknown.

Additional specimens examined: **TEXAS: Cherokee Co.:** ca. 9.5 mi E of Troup, ca. 6 mi W of Price, ca. 3.5 mi N of Hwy 13, sandylands, 12 Jul 1977, *G. Ajilvsgi* 5038 (BRIT). **Smith Co.:** sandy woods east of Swan, 16 May 1902, *J. Reverchon* 2962 [two sheets] (MO); on R.R. [railroad] near Lindale, Apr 1923, *J. Reverchon s.n.* (MO); western Tyler along Cotton Belt Railway, east end of Pine Burr Rd., infrequent at edge of woods along railway, 21 May 1949, *V.L. Cory* 56212 (SMU); western Tyler, S of Pine Burr Rd, infrequent in sandy woods, 10 Aug 1950, *V.L. Cory* 57860 (SMU); just N of Interstate 20 in woods E of Old Tyler-Mineola Rd., 20 Oct 1965, *D.S. Correll & H.B. Correll* 32041 (LL); sandy field with scattered post oak in SW angle where US Rte. 69 and Loop 323 intersect, north edge of Tyler, 28 Aug 1966, *D.S. Correll* 33513 (LL); pure sand in field on Loop 323 near intersection with Rte. 69, Tyler, 6 Jun 1969, *D.S. Correll* 37401 (LL); in SW angle of intersection of US 69 and Loop 323, N edge of Tyler, under oaks next to 12 Oaks Motor Hotel, growing in sandy field under *Quercus incana*, *Q. margaretta*, with *Opuntia*, *Yucca*, 22 Jun 1975, *W.M. Dennis* 51718 (TENN); NW portion of city of Tyler, 0.75 km WSW of junction of TX State Hwy 323 Loop and US Hwy 69, ca. 20 m SW of junction of Hwy 323 Loop and Silver Creek Dr., 32°22'42.1"N, 95°20'20.6"W, along N edge of scrubby oak-hickory woods and in a small opening nearby, rooted in deep sand and scrambling over small shrubs and herbs, with *Quercus*



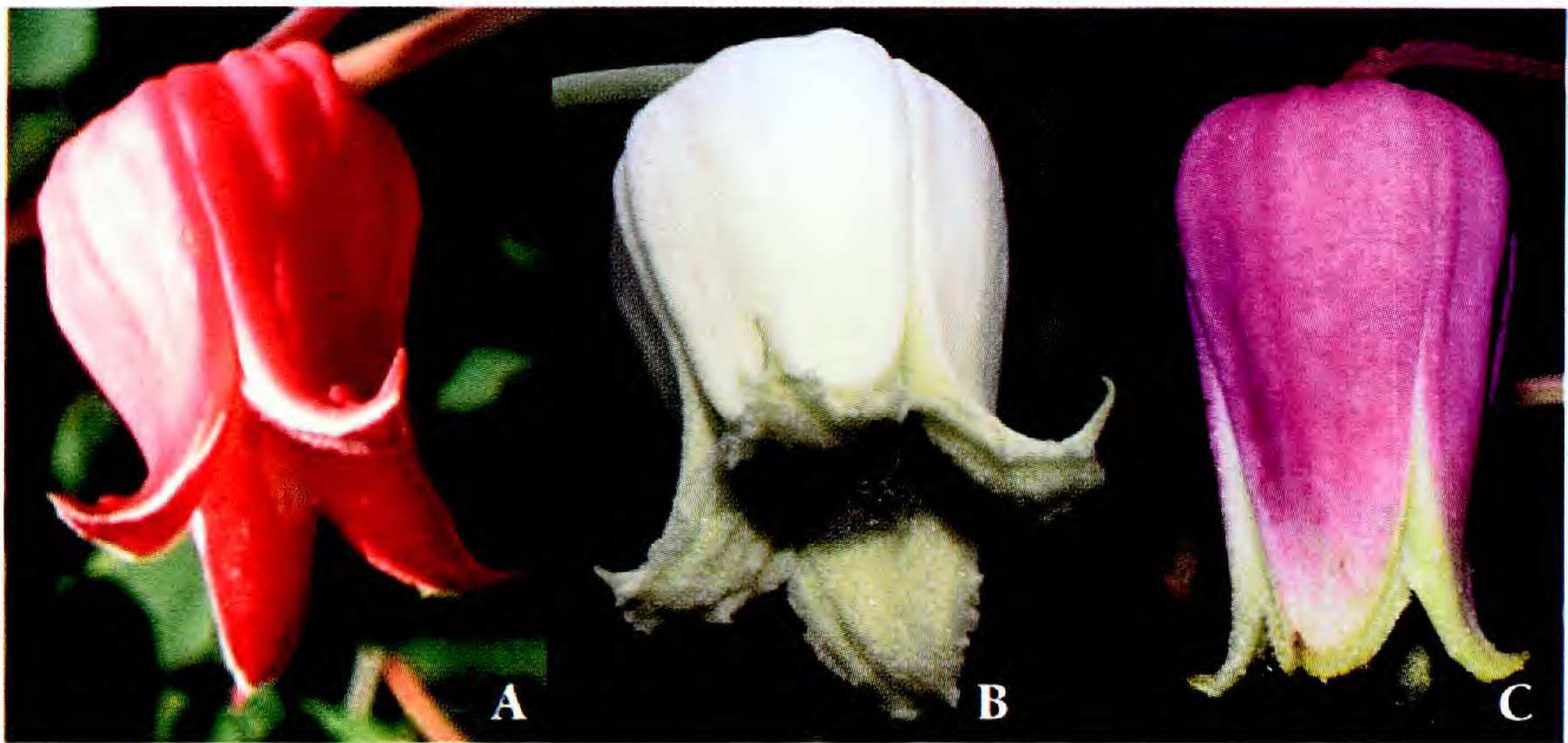


FIG. 4. Flowers of *Clematis texensis* (A), *Clematis carrizoensis* (B), and *Clematis versicolor* (C).

spp., *Carya*, *Rhus aromatica*, *Prunus gracilis*, and *Toxicodendron pubescens*, 9 May 2005, D. Estes 07032 (GH, NY, TENN, VDB). **Van Zandt Co.:** 2.3 mi E of Ben Wheeler, sandy loam, 6 May 1951, R. Van Vleet 1257 (SMU).

*Distribution and Habitat.*—*Clematis carrizoensis* is endemic or nearly endemic to the Carrizo Formation, a narrow zone (19 km wide) of relatively deep deposits of coarse to fine sand that trends southwest to northeast for ca. 720 km from south-central to northeastern Texas (Macbryde 1933; Sorrie and Weakley 2001). Sorrie and Weakley (2001) identified an additional 12 taxa endemic or nearly endemic to this formation. Within the Carrizo Sands, *C. carrizoensis* has only been collected from three contiguous counties, Cherokee, Smith, and Van Zandt, all in the northeastern section of the formation. *Clematis carrizoensis* grows in or along the edges of open, well-drained, prairie-like areas in full sun or partial shade. Within these communities, *C. carrizoensis* trails along the ground or over low herbs, shrubs, or fences, apparently rarely climbing higher into low branches of trees. Oak-hickory woodlands or thickets border these sites. Dominant tree species associated with one population of *C. carrizoensis* in Tyler, Texas (site of D. Estes 07032 cited above) include *Quercus incana* Bartr., *Q. marilandica* Muench., *Q. nigra* L., *Q. stellata* Wang., *Carya texana* Buckl., *Sassafras albidum* (Nutt.) Nees, and *Ulmus crassifolia* Nutt. Frequent small trees, shrubs and woody vines were *Opuntia* sp., *Prunus caroliniana* (P. Mill.) Ait., *P. gracilis* Engelm. & A. Gray, *Rhus aromatica* Ait., *R. copallinum* L., *R. glabra* L., *Rubus trivialis* Michx., *Stillingia sylvatica* Garden ex L., *Toxicodendron pubescens* P. Mill., *Vaccinium arboreum* Marsh., *Viburnum rufidulum* Raf., *Vitis mustangensis* Buckl., *V. rotundifolia* Michx. and *Yucca* sp. *Baptisia* sp., *Cnidoscolus texanus* (Muell.-Arg.) Small, *Croton argyranthemus* Michx., *Mimosa* sp., *Paronychia drummondii* Torr. & A. Gray, *Pteridium aquilinum* (L.) Kuhn, *Rumex hastatulus* Baldw.,



*Schizachyrium scoparium* (Michx.) Nash and *Talinum rugospermum* Holzinger were closely associated herbaceous taxa.

*Phenology*.—*Clematis carrizoensis* flowers from early May to early August; fruits are produced beginning in late June and persist until November.

*Etymology*.—The specific epithet “*carrizoensis*” was selected in honor of the Carrizo Sands, the geologic formation to which *C. carrizoensis* is apparently restricted.

*Common Names*.—Carrizo sands leather-flower; sand clematis

*Conservation Significance*.—*Clematis carrizoensis* is a rare species. I have seen only 12 specimens from three counties in northeastern Texas; 10 of these are from just four sites in a small area of Smith County. Label data from herbarium specimens also indicate that this species is uncommon where it occurs. Most of the specimens examined for this study were collected over 30 years ago possibly indicating that this species is declining or simply overlooked. Most of the populations represented by collections are located near or in the city of Tyler, Texas. These populations may be subject to extirpation by future development. This species should be searched for in other sandy sites, particularly those associated with the Carrizo Formation, in northeastern Texas as well as in sandy habitats in nearby portions of Miller County, Arkansas and Caddo Parish, Louisiana. This species should be considered endangered and should be afforded protection at both the state and federal level.

### **Species of the *Clematis glaucophylla* Complex**

Five species comprise the *C. glaucophylla* complex. While all species differ in rather subtle morphological characteristics, they are all allopatric and mostly inhabit different plant communities in different physiographic provinces. The complex is in need of a detailed phylogenetic study.

***Clematis addisonii***, a narrow endemic of a four county area in the Ridge and Valley of western Virginia (Fig. 1), inhabits dry calcareous woods and outcrops (Kral 1983). It is characterized by a mostly erect, non-twining habit, mostly simple, thin, and inconspicuously reticulate cauline leaves, and solitary terminal flowers that have purple to reddish-purple sepals with whitish apices.

***Clematis glaucophylla*** ranges from northwestern Florida west to southeastern Mississippi and north to southeastern Tennessee (Fig. 1); it is reportedly disjunct to McCurtain County, Oklahoma (Dennis 1976). Reports of *C. glaucophylla* from Kentucky (Jones 2005) are based on misidentified specimens (D. Estes, pers. obs.). Throughout most of its range in the Piedmont and Gulf Coastal Plain, *C. glaucophylla* grows in sandy neutral to slightly acidic soils along streams (Dennis 1976), but at some sites in Alabama and southeastern Tennessee, *C. glaucophylla* grows at the edges of dry rocky calcareous forests (D. Estes, pers. obs.). *Clematis glaucophylla* has a viny habit and compound cauline leaves that have mostly thin and inconspicuously reticulate leaflets. The proximal leaf-



lets are often deeply lobed, divided, or ternate. Flowers of *C. glaucophylla* are borne on axillary peduncles and have sepals that are cherry-red or reddish-purple abaxially and light colored near the abaxial tip and on the whole surface adaxially.

***Clematis texensis*** is endemic to the Edward's Plateau of Texas (Fig. 1) where it is often associated with calcareous woodlands, edges, cliffs, and stream banks. The species has a viny habit and compound cauline leaves with relatively thick and conspicuously reticulate leaflets. The proximal leaflets vary from simple to lobed or ternate. The flowers are borne on axillary peduncles and the sepals are scarlet or rose-red abaxially and near the tip adaxially (Fig. 4).

***Clematis versicolor*** has a bicentric distribution with part of its range centered in the Interior Highlands of southwestern Missouri, western Arkansas, and eastern Oklahoma and the other portion centered in the Interior Low Plateau of central Tennessee, extreme northern Alabama, and south-central Kentucky (Fig. 1). It is usually associated with calcareous bluffs, dry woods, and roadsides with exposed limestone. *Clematis versicolor* has a viny habit, relatively thick and conspicuously reticulate compound cauline leaves with the proximal leaflets entire or rarely lobed or divided, and flowers borne on axillary peduncles. The abaxial surfaces of the sepals of *C. versicolor* are mostly purplish-red proximally and often are cream-colored or greenish distally (Fig. 4).

***Clematis carrizoensis*** is restricted to sandy prairie-like areas among oak-hickory woodlands in three counties in northeastern Texas (Fig. 1). The species has a viny habit, thick and conspicuously reticulate compound leaves that have proximal leaflets frequently lobed, divided, or ternate, flowers borne on axillary peduncles, and sepals that are abaxially yellowish-cream and faintly tinged with lilac proximally (Fig. 4).

### **Characters Useful for Distinguishing Members of the *Clematis glaucophylla* Complex**

The members of the *C. glaucophylla* complex can be distinguished by differences in habit, leaf dissection, leaf texture, leaflet shape, degree of vein reticulation, flower position, sepal color, habitat, and geography (Table 1; Fig. 1).

In terms of habit, *C. addisonii* is the only erect non-viny member of the complex. It has stems that are mostly less than 1 m tall whereas the other species in the complex have viny stems mostly greater than 1 m in length. Dennis (1976) noted that while *C. addisonii* is the only species in the complex that exhibits this growth form, occasional individuals of *C. addisonii* bear apical branches that often become entangled and approach a viny habit.

Leaf dissection is a character that is only generally useful for distinguishing species of the complex, the exception being *C. addisonii*. *Clematis addisonii* has leaves that are mostly simple but occasionally vary to pinnate with up to six leaflets. The rest of the species of the complex have leaves that are pinnate



TABLE 1. Characteristics of the *Clematis glaucophylla* complex, compiled from data presented in Dennis (1976) and Pringle (1997).

	<b>texensis</b>	<b>carrizoensis</b>	<b>versicolor</b>	<b>addisonii</b>	<b>glaucophylla</b>
<b>Habit</b>	viny, > 1 m	viny, > 1 m	viny, > 1 m	erect, < 1 m	viny, > 1 m
<b>Leaf Dissection</b>	1-pinnate to pinnate-ternate, proximal leaflets commonly lobed or 3-foliate	1-pinnate to pinnate-ternate, proximal leaflets commonly lobed or 3-foliate	1-pinnate, proximal leaflets mostly unlobed, occasionally 2–3 lobed	simple, or distal leaves 1-pinnate	1-pinnate to pinnate-ternate, proximal leaflets commonly lobed or 3-foliate
<b>Leaf Texture</b>	coriaceous	coriaceous	coriaceous	thin	thin
<b>Venation</b>	reticulate, raised	reticulate, raised	reticulate, raised	not reticulate, not raised	not reticulate, not raised
<b>Flower Position</b>	mostly axillary	mostly axillary	mostly axillary	mostly terminal	mostly axillary
<b>Flower Color</b>	scarlet to rose-red	yellowish-cream, lilac-tinged proximally	purplish-red to bluish-lavender, creamy or greenish distally	purple to purplish-red, whitish distally	cherry red to reddish-purple

to pinnate-ternate with more than six leaflets. The degree of compounding of the proximal leaflets is a useful yet non-diagnostic character that according to Erickson (1943) “must be used with judgment.” For example, Erickson (1943) noted that leaf dissection may generally be used to separate *C. texensis* and *C. versicolor*. *Clematis glaucophylla*, *C. texensis*, and *C. carrizoensis* frequently have lobed, divided, or ternate proximal leaflets whereas the proximal leaflets of *C. versicolor* are usually unlobed or rarely lobed or ternate.

Erickson (1943) considered leaflet shape to be of general use in delimiting taxa, especially the leaflet apices. Generally, *C. addisonii*, *C. glaucophylla*, and *C. versicolor* have broadly to narrowly obtuse leaflet apices. *Clematis texensis* and *C. carrizoensis* have leaflet apices that are more frequently emarginated apically but that vary to obtuse. Leaflets of *C. carrizoensis*, *C. texensis*, and *C. versicolor* are almost always mucronate at the apex.

Among the species of the *C. glaucophylla* complex, two groups can be delineated based on leaf texture and degree of leaf vein reticulation. *Clematis glaucophylla* and *C. addisonii* belong to a group characterized by relatively thin and non-reticulate leaves. The other group, consisting of *C. carrizoensis*, *C. texensis* and *C. versicolor*, has relatively thick and conspicuously reticulate leaves. Once again, these characters are relative and are hard to differentiate when only one species is encountered and can sometimes be difficult to assess



from herbarium material. Furthermore, shade plants of all species of the complex may be thin and non-reticulate.

Flower position is a character that is of limited taxonomic value in the *C. glaucophylla* complex. Most species have flowers borne on axillary peduncles; however, *C. addisonii* has flowers that are mostly borne on terminal peduncles.

Perhaps one of the most useful characters for distinguishing the members of the *C. glaucophylla* complex is sepal color (Table 1, Fig. 4). Unfortunately, it is also the character that is most difficult to preserve and interpret on herbarium specimens. In *C. glaucophylla*, the sepals are more frequently cherry red to reddish-purple abaxially except distally they are often light colored. *Clematis texensis* has sepals that are generally scarlet or rose-red, and the red coloration is present on both the abaxial surface and on the distal portion of the adaxial surface. Compared to *C. glaucophylla* and *C. texensis*, the sepals of *C. addisonii* are more purplish, varying from light purple to purplish-red with whitish apices. Typical specimens of *C. versicolor* have sepals that are purplish-red or bluish-lavender proximally and cream-colored or greenish distally. The sepals of *C. carrizoensis* are yellowish-cream and lightly tinged with lilac proximally.

Habitat can be used to distinguish the species of the *C. glaucophylla* complex to some extent. *Clematis addisonii*, *C. texensis*, and *C. versicolor* are apparently obligate calciphiles. *Clematis glaucophylla* is a facultative calciphile. *Clematis carrizoensis* is not associated with calcareous rock outcrops but rather is restricted to deep sandy soils. All of the species seem to grow best in edge habitats; however *C. addisonii*, *C. texensis*, and *C. versicolor* are sometimes found in closed-canopy forests.

When incomplete or non-flowering specimens of species of the *C. glaucophylla* complex are encountered, the most reliable character that can be used to distinguish the species is geography. All of the taxa are allopatric. The ranges of *C. versicolor* and *C. glaucophylla* abut one another in portions of southeastern middle Tennessee and possibly extreme northern Alabama. *Clematis texensis* and *C. carrizoensis* are restricted to Texas and *C. addisonii* is restricted to Virginia. *Clematis versicolor* is found only in portions of Oklahoma, Arkansas, Missouri, Kentucky, Tennessee, and Alabama; it should be also searched for in extreme northeastern Mississippi (Tishomingo Co.) and in extreme southern Illinois. *Clematis glaucophylla* occurs in Mississippi, Alabama, Georgia, Florida, and Tennessee. Alabama and Tennessee are the only two states that support more than one species of the complex.

KEY TO THE SPECIES OF THE *CLEMATIS GLAUCOPHYLLA* COMPLEX  
(ADAPTED FROM ERICKSON 1943, DENNIS 1976, AND PRINGLE 1997)

1. Plants ascending to erect, sometimes branched above, rarely viny; middle and lower cauline leaves mostly simple; flowers mostly terminal; restricted to Ridge and Valley Province of western Virginia \_\_\_\_\_ **C. addisonii** Britton



1. Plants scrambling or climbing, viny; middle and lower cauline leaves compound; flowers axillary; species not of Virginia.
2. Leaves usually thin, adaxial surface without raised secondary and tertiary veins  
\_\_\_\_\_ **C. glaucophylla** Small
2. Leaves usually thick, adaxial surface with moderately to prominently raised secondary and tertiary veins.
3. Abaxial surface of sepals scarlet to rose-red or yellowish-cream and lightly lilac tinged; leaflets mostly ovate to subrotund, base mostly subcordate to deeply cordate, apex usually emarginated; lower leaflets commonly 2–3-lobed or 3-foliate; plants restricted to Texas.
4. Sepals scarlet to rose-red abaxially; stamens not densely or uniformly pubescent, connective mostly glabrous or with a few stiff trichomes; plants of limestone uplands of the Edwards's Plateau in south-central Texas \_\_\_\_\_ **C. texensis** Buckley
4. Sepals yellowish-cream abaxially and lightly tinged with lilac; stamens densely and uniformly pubescent, connective moderately to densely pubescent; plants of deep sandy habitats of northeastern Texas \_\_\_\_ **C. carrizoensis**  
D. Estes
3. Abaxial surface of sepals purplish-red or bluish-lavender proximally and cream-colored or greenish distally; leaflets mostly ovate to elliptic, base obtuse to subcordate, apex mostly obtuse; lower leaflets mostly unlobed and undivided, infrequently lobed or ternate; plants of the Interior Highlands of Missouri, Oklahoma, and Arkansas and the Interior Low Plateau of Tennessee, Kentucky, and Alabama \_\_\_\_\_ **C. versicolor** Small

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